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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/775,907	HOLBOROW, CLIVE E.	
	Examiner	Art Unit	
	Andrew Lai	2616	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *10 February 2004*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-29* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-29* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *10 February 2004* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

2. Claims 1 – 29 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sorenson et al (US 2003/0053476, Sorenson hereinafter) in view of Thi et al (US 2002/0061012, Thi hereinafter)

Examiner's note: Sorenson presents his system by **functionalities**, such as "Integration Into Existing Cable Network Architecture" section (starting with [0077]) discussing multiplexing data streams, "Frame Management Sublayer (FMS) Data Flow" section (starting [0149]) disclosing certain hardware configurations and data protocols, and "Network Clocking" section (starting with [0171]) teaching associated clock synchronization and recovering. It should be understood that all of the sections are different parts of the architecture for "mapping of bit streams into MPEG frames" as the title of the patent application suggests and thus are interdependent thereupon one another.

- **<u>Regarding independent claims 1, 8, 14, 17 and 20</u>**

Sorenson discloses "mapping of bit streams into MPEG frames" (p1 left col. lines 1-2) wherein data are communicated between "transport modem termination system (TMTS)", fig. 12 left half, as downlink/uplink

transmitter/receiver, and "client transport modems (CTM)", fig. 12 right half, as downlink/uplink receiver/transmitter, via "CT (cable transmission) network", fig. 12 item 1220, comprising the following features:

Claim 1, *a method for multiplexing Data Over Cable Service Interface Specifications (DOCSIS) data into an Moving Pictures Experts Group (MPEG) Transport Stream* (see "Each downstream data flow is fragmented into individual octets that are multiplexed into MPEG packets" recited Abstract lines 8-9. Also refer to fig. 4 depicting "DOCSIS data 403" being multiplexed by multiplexer 415 or "combiner 415" as termed [0086] line 5 and see "support downstream transmission for commonly-deployed services such as, but not limited to, DOCSIS cable modems and digital TV using MPEG video" recited p12 left col. lines 3-6) *comprising:*

multiplexing a DOCSIS data stream into an MPEG Transport Stream (see above cited texts) *while preserving the accuracy of a number of MPEG program clock reference (PCR) values* (refer to fig. 20 and see "MPEG framer 2046 performs the function of inserting the program clock reference into MPEG frames" recited [0179] lines 3-5);

transmitting said multiplexed Transport Stream (see fig. 20 for transmission indication arrow below "QAM modulator(s) 2048" to "CT network 2008") *including said PCR values* (refer still to fig. 20 and see "Interval counter 2042 generates a 0.1 Hz interval clock 2044 that generally determines that rate at which snapshots of the 42 bit counter are sent downstream as the program

clock reference (PCR) in the adaptation field of MPEG packets" recited [0179] lines 5-9);

receiving said multiplexed Transport Stream in a receiving device (refer to fig. 20 and see "On the downstream side the client transport modem (cTM 2006) includes the hardware and/or software to properly extract the MPEG frames and interpret the fields" recited [0180] lines 1-3);

recovering said MPEG PCR value (refer to fig. 20 and see "functions might be performed in cTM downstream front end to extract MPEG 2052 and program clock reference parser 2054" recited [0180] lines 3-6);

generating a DOCSIS clock based on said MPEG PCR value (refer to fig. 20 and see "Based on the PCR value extracted from MPEG adaptation fields, the client transport modem 2006 determines how much the cTM master clock has drifted relative to the TMTS master clock" recited [0180] lines 6-9, followed by the step of "The 162 Mhz clock is divided by 6 at item 2068 to result in a 27 MHz clock that is the cTM master clock 2072" recited [0181] lines 4-6. It should be noted that although Sorenson herein teaches clocking cTM system using MPEG PCR, it would have been obvious to one skilled in the art to use the same mechanism, with no difficulty, for generating reference clock for downstream DOCSIS **especially** because Sorenson teaches "Normally, MPEG PCR information in downstream MPEG packets is used to clock downstream flows of audio/visual information" as recited [0182] lines 5-6);

Claim 8, *a system* (fig. 4 and see "An architecture" recited Abstract line 1) *for multiplexing Data Over Cable Service Interface Specifications (DOCSIS) data*

into an Moving Pictures Experts Group (MPEG) Transport Stream (see "Each downstream data flow is fragmented into individual octets that are multiplexed into MPEG packets" recited Abstract lines 8-9. Also refer to fig. 4 depicting "DOCSIS data 403" being multiplexed by multiplexer 415 or "combiner 415" as termed [0086] line 5 and see "support downstream transmission for commonly-deployed services such as, but not limited to, DOCSIS cable modems and digital TV using MPEG video" recited p12 left col. lines 3-6) *comprising:*

a signal transmitter (fig. 12 left half labeled "transport modem termination system (TMTS)") *including a multiplexer* (fig. 12 "downstream MUX 1214" noting "MUX" is a commonly used abbreviation in the art for "multiplexer", or fig. 4 multiplexer 415 "combiner 415" as termed [0086] line 5);

a signal receiver (fig. 12 right half labeled "client transport modem (CTM)" [or cTM as Sorenson uses in the text]) *communicatively coupled to said signal transmitter* (fig. 12 depicting said "CTM" coupled to said "TMTS" via "CT network 1220");

wherein said signal transmitter is configured to multiplex said DOCSIS data into said MPEG Transport Stream (cited above), *and transmit said MPEG Transport Stream to said signal receiver including a number of MPEG program clock reference (PCR) values corresponding to said DOCSIS data* (refer to fig. 20 and see "MPEG framer 2046 performs the function of inserting the program clock reference into MPEG frames. Interval counter 2042 generates a 0.1 Hz interval clock 2044 that generally determines that rate at which snapshots of the 42 bit

counter are sent downstream as the program clock reference (PCR) in the adaptation field of MPEG packets" recited [0179] lines 3-9);

wherein said receiver is configured to generate a DOCSIS clock value for said DOCSIS data base upon said MPEG PCR values (refer to fig. 20 and see ***a.*** "On the downstream side the client transport modem (cTM 2006) includes the hardware and/or software to properly extract the MPEG frames and interpret the fields" recited [0180] lines 1-3; ***b.*** "functions might be performed in cTM downstream front end to extract MPEG 2052 and program clock reference parser 2054" recited [0180] lines 3-6; and ***c.*** "Based on the PCR value extracted from MPEG adaptation fields, the client transport modem 2006 determines how much the cTM master clock has drifted relative to the TMTS master clock" recited [0180] lines 6-9, followed by the step of "The 162 Mhz clock is divided by 6 at item 2068 to result in a 27 MHz clock that is the cTM master clock 2072" recited [0181] lines 4-6. It should be noted that although Sorenson herein teaches clocking cTM system using MPEG PCR, it would have been obvious to one skilled in the art to use the same mechanism, with no difficulty, for generating reference clock for downstream DOCSIS **especially** because Sorenson also teaches "Normally, MPEG PCR information in downstream MPEG packets is used to clock downstream flows of audio/visual information" as recited [0182] lines 4-6);

Claim 14, *a system* (fig. 4 and see "An architecture" recited Abstract line 1) *for multiplexing Data Over Cable Service Interface Specifications (DOCSIS) data into an Moving Pictures Experts Group (MPEG) Transport Stream* (see

"Each downstream data flow is fragmented into individual octets that are multiplexed into MPEG packets" recited Abstract lines 8-9. Also refer to fig. 4 depicting "DOCSIS data 403" being multiplexed by multiplexer 415 or "combiner 415" as termed [0086] line 5 and see "support downstream transmission for commonly-deployed services such as, but not limited to, DOCSIS cable modems and digital TV using MPEG video" recited p12 left col. lines 3-6) *comprising:*

means for transmitting a signal (fig. 12 left half labeled "transport modem termination system (TMTS)" and especially "RF TX 1218", noting "TX" is a commonly used abbreviation in the art for "transmitter");

means for multiplexing (fig. 12 "downstream MUX 1214" noting "MUX" is commonly used abbreviation in the art for "multiplexing/multiplexer", or fig. 4 multiplexer 415 or "combiner 415" as termed [0086] line 5) *communicatively coupled to said means for transmitting* (fig. 12 depicting said multiplexer 1214 coupling to said transmitter 1218);

means for receiving a signal (fig. 12 right half labeled "client transport modem (CTM)" [or cTM as Sorenson uses in his text] and particularly "RF RX 1222" noting "RX" is a commonly used abbreviation in the art for "receiving/recerver") *communicatively coupled to said means for transmitting* (fig. 12 depicting said receiving mean 1222 coupling with said transmitting means 1218 via "CT network 1220");

wherein said means for transmitting is configured to multiplex said DOCSIS data into said MPEG Transport Stream (cited above), *and transmit said MPEG Transport Stream to said means for receiving a signal including a number*

of MPEG program clock reference (PCR) values corresponding to said DOCSIS data (refer to fig. 20 and see "MPEG framer 2046 performs the function of inserting the program clock reference into MPEG frames. Interval counter 2042 generates a 0.1 Hz interval clock 2044 that generally determines that rate at which snapshots of the 42 bit counter are sent downstream as the program clock reference (PCR) in the adaptation field of MPEG packets" recited [0179] lines 3-9);

wherein said means for receiving a signal is configured to generate a DOCSIS clock value for said DOCSIS data base upon said MPEG PCR values (refer to fig. 20 and see ***a.*** "On the downstream side the client transport modem (cTM 2006) includes the hardware and/or software to properly extract the MPEG frames and interpret the fields" recited [0180] lines 1-3; ***b.*** "functions might be performed in cTM downstream front end to extract MPEG 2052 and program clock reference parser 2054" recited [0180] lines 3-6; and ***c.*** "Based on the PCR value extracted from MPEG adaptation fields, the client transport modem 2006 determines how much the cTM master clock has drifted relative to the TMTS master clock" recited [0180] lines 6-9, followed by the step of "The 162 Mhz clock is divided by 6 at item 2068 to result in a 27 MHz clock that is the cTM master clock 2072" recited [0181] lines 4-6. It should be noted that although Sorenson herein teaches clocking cTM system using MPEG PCR, it would have been obvious to one skilled in the art to use the same mechanism, with no difficulty, for generating reference clock for downstream DOCSIS **especially** because Sorenson also teaches "Normally, MPEG PCR information in downstream MPEG

packets is used to clock downstream flows of audio/visual information" as recited [0182] lines 5-6);

Claim 17, *a transmitter* (fig. 12 left half labeled "transport modem termination system (TMTS)" or fig. 4 left half to "O/E interface 420" of which the clocking management is shown in fig. 20) *configured to multiplex Data Over Cable Service Interface Specifications (DOCSIS) data into an Moving Pictures Experts Group (MPEG) Transport Stream* (see "Each downstream data flow is fragmented into individual octets that are multiplexed into MPEG packets" recited Abstract lines 8-9. Also refer to fig. 4 depicting "DOCSIS data 403" being multiplexed by multiplexer 415 or "combiner 415" as termed [0086] line 5 and see "support downstream transmission for commonly-deployed services such as, but not limited to, DOCSIS cable modems and digital TV using MPEG video" recited p12 left col. lines 3-6) *comprising:*

a transmitter (fig. 12 "RF TX 1218" noting "TX" is a commonly used abbreviation in the art for "transmission/transmitter");

a multiplexer (fig. 12 "downstream MUX 1214" noting "MUX" is a commonly used abbreviation in the art for "multiplexing/multiplexer" or fig. 4 multiplexer 415 "combiner 415" as termed [0086] line 5) *communicatively coupled to said transmitter* (fig. 12 depicting said multiplexer 1214 coupled to said transmitter 1218);

wherein said multiplexer is configured to multiplex said DOCSIS data into said MPEG Transport Stream (cited above) *such that a DOCSIS clock associated with said DOCSIS data may be generated from a number of MPEG*

program clock reference (PCR) values (refer to fig. 20 and see the following steps: ***a.*** "MPEG framer 2046 performs the function of inserting the program clock reference into MPEG frames" recited [0179] lines 3-5; ***b.*** "functions might be performed in cTM downstream front end to extract MPEG 2052 and program clock reference parser 2054" recited [0180] lines 3-6; and ***c.*** "Based on the PCR value extracted from MPEG adaptation fields, the client transport modem 2006 determines how much the cTM master clock has drifted relative to the TMTS master clock" recited [0180] lines 6-9, followed by the step of "The 162 Mhz clock is divided by 6 at item 2068 to result in a 27 MHz clock that is the cTM master clock 2072" recited [0181] lines 4-6. It should be noted that although Sorenson herein teaches clocking cTM system using MPEG PCR, it would have been obvious to one skilled in the art to use the same mechanism, with no difficulty, for generating reference clock for downstream DOCSIS **especially** because Sorenson has also suggested "Normally, MPEG PCR information in downstream MPEG packets is used to clock downstream flows of audio/visual information" as recited [0182] lines 5-6);

Claim 20, *a data receiver* (fig. 12 right half labeled "client transport modem (CTM) [or cTM as Sorenson uses in his text] and especially "RF RX" 1222 noting "RX" is a commonly used abbreviation in the art for "receiving/receiver") *comprising:*

a tuner (Note that "RF RX 1222" is for receiving "RF" or radio frequency. It is notorious old and well known in the art that an RF receiver has to have a tuner therein because "receiving an RF" by definition is "tuning into an RF");

a demodulator (fig. 12 "downstream demod[ulator] 1224");

a processor (fig. 28 "MPEG packet processor 1818");

wherein said data receiver is configured to receive (refer to fig. 20 and see "cTM downstream front end to extract MPEG 1052") *a multiplexed Moving Picture Expert Group (MPEG) Transport Stream including Data Over Cable Service Interface Specifications (DOCSIS) data* (see fig. 20 the "TMTS 2004" part above dashed line 2002 for "QAM modulator(s) 2048" and "such QAM modulators have been used in CATV networks to support downstream transmission for commonly-deployed services such as, but not limited to, DOCSIS cable modems and digital TC using MPEG video" recited p12 lines 2-6) *and a plurality of MPEG program clock reference (PCR) values* (refer to fig. 20 and see, above said "QAM modulator(s) 2048", "42-bit counter and MPEG framer (PCR insertion) 2046");

wherein said receiver is configured to generate a DOCSIS clock value for said DOCSIS data based upon said MPEG PCR values (fig. 20 from "cTM downstream front end to extract MPEG 2052" to "PCR passer 2054" to "cTM master clock 27 MHz 1072" and see "Based on the PCR value extracted from MPEG adaptation fields, the client transport modem 2006 determines how much the cTM master clock has drifted relative to the TMTS master clock" recited [0180] lines 6-9, followed by the step of "The 162 Mhz clock is divided by 6 at item 2068 to result in a 27 MHz clock that is the cTM master clock 2072" recited [0181] lines 4-6. It should be noted that although Sorenson herein teaches clocking cTM system using MPEG PCR, it would have been obvious to one

skilled in the art to use the same mechanism, with no difficulty, for generating reference clock for downstream DOCSIS **especially** because Sorenson also teaches "Normally, MPEG PCR information in downstream MPEG packets is used to clock downstream flows of audio/visual information" as recited [0182] lines 5-6).

Sorenson does not expressly disclose the following features:

Claim 1, *synchronizing an MPEG system clock and a DOCSIS system clock*;

Claims 8, 14 and 17, *synchronize an MPEG system clock and a DOCSIS clock;*

although the implication is therein because it is well known in the art that multiplexing two different data streams needs to have the data streams first synchronized according to time sequence or otherwise the result of multiplexing will be unpredictable or undesirable.

Thi, regardless above cited implied feature of Sorenson, discloses a "cable modem with voice processing capability" (p1 left col. lines 1-2) wherein a "DOCSIS MAC extracts DOCSIS MAC frames from MPEG-2 frames" ([0122] lines 6-7) comprising the feature of:

Claim 1, *synchronizing an MPEG system clock and a DOCSIS system clock;* and

Claims 8, 14 and 17, *synchronize an MPEG system clock and a DOCSIS clock.*

(see "in one aspect of the present invention, a method of synchronizing data clocked by a first clock to a second clock includes generating a clock error signal as a function of one ore more data control flags, and fractionally resampling the data as a function of the offset" recited [0010])

It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the system of Sorenson by adding the data clock synchronization of Thi to Sorenson, noting that Sorenson has in fact implicitly taught clock synchronization as is necessary for data multiplexing, in order to provide a more convenient gateway "for interfacing telephony voice with DOCSIS compatible networks" as taught by Thi ([0002] lines 2-4).

- **Regarding independent claims 22 and 26**

Claim 22 recites:

A method for multiplexing Data Over Cable Service Interface Specifications (DOCSIS) data into an Moving Pictures Experts Group (MPEG) Transport Stream comprising:
synchronizing an MPEG system clock and a DOCSIS system clock;
multiplexing a DOCSIS data stream into an MPEG Transport Stream while preserving the accuracy of a number of DOCSIS SY-NC timestamp values;
transmitting said multiplexed Transport Stream including said DOCSIS SYNC timestamp values;
receiving said multiplexed Transport Stream in a receiving device; recovering said DOCSIS SYNC timestamp values; and generating an MPEG system clock based on said DOCSIS SYNC timestamp values.

Claim 26 recites:

A method for multiplexing Data Over Cable Service Interface Specifications (DOCSIS) data into an Moving Pictures Experts Group (MPEG) Transport Stream comprising:
synchronizing an MPEG system clock and a DOCSIS system clock to a third clock; multiplexing a DOCSIS data stream into an MPEG Transport Stream;
transmitting said multiplexed Transport Stream including a number of time stamp values from said third clock;
receiving said multiplexed Transport Stream in a receiving device; recovering said time stamp values from said third clock; and
generating both an MPEG system clock and a DOCSIS system clock based on said time stamp values from said third clock.

The differences of these two claims from claim 1 discussed above can be summarized as:

As an alternative to the features set forth in claim 1, **Claim 22** sets forth the limitations of interchanging the roles of DOCSIS and MPEG by using DOCSIS timestamps to recover reference clock for MPEG, while features in claim 1 use MPEG PCR to recover reference clock for DOCSIS ("MPEG PCR SOLUTION" hereinafter).

As yet another alternative to the features set forth in claim 1, **Claim 26** sets forth the limitations of using timestamps of a common clock to both DOCSIS and MPEG to recover reference clocks for both DOCSIS and MPEG, while the "MPEG PCR SOLUTION" uses MPEG PCR to recover reference clock for DOCSIS.

However, Applicant provides **no** description whatsoever (see present application page 14 paragraphs 1 and 2) regarding:

A. particularly **different** technical problems said two alternatives are solving than those of the "MPEG PCR SOLUTION";

B. if for solving the **same** technical problems of the "MPEG PCR SOLUTION", the advantages of said two alternatives over the "MPEG PCR SOLUTION" and the improvement thereof in terms of results.

On the other hand, Sorenson in view of Thi provides said "MPEG PCR SOLUTION" that appears to be working equally well and efficient as said two alternatives.

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to use **any of the solutions** set forth in claim 1, 22 or 26 to **achieve equal results**.

However, Applicant is referred to paragraph 3 below for further Office Actions regarding both claims 22 and 26.

- **Regarding dependent claims**

(Examiner's note: In all of the discussions below, reference is made **only** to Sorenson)

Group of Claim 1:

Claim 2, *wherein said multiplexing a DOCSIS data stream into an MPEG Transport Stream comprises overwriting a number of null packets of said MPEG Transport Stream with a number of packets containing DOCSIS data* (refer to fig. 23 and see "the TMTS includes TMTS controller 2372 that operates with downstream map state machine 2374 to cause the Ethernet data from the correct data flow to be placed in the proper octet of the MPEG frames" recited p26 right col. lines 2-6. It should be noted that, a) Sorenson is using Ethernet data here to demonstrate the feature. Fig. 4 shows that "DOSSIS data 403" can be equally multiplexed as that of Ethernet data from "802.3 PHY" sources. Therefore, it is obvious that the same feature said above is equally applicable to DOCSIS; b) it is obvious to one skilled in the art that said "correct data flow to be placed in the proper octet of the MPEG frames" will have to be placed in null octets or otherwise MPEG data will be lost, causing serious playback problem in the receiving side).

Claim 3, *wherein said generating said DOCSIS clock based on said MPEG PCR values comprises:*

receiving said MPEG PCR values in said receiving device (fig. 20 "cTM downstream front end to extract MPEG 2052", which contains PCR values as shown in the transmission side "42-bit counter and MPEG framer (PCR insertion) 2046");

recovering said MPEG system clock (fig. 20 "PCR PARSER 2054");

scaling said MPEG system clock (fig. 20 "divide by 6 1068") *using a phase-locked loop* (refer to fig. 20 "cTM master clock 27 MHz 2072" and see "this 27 MHz cTM master clock has been generally locked to the TMTS master clock 2036, which was further locked to the 8kHz reference source in phase locked loop" recited [0181] lines 6-9) *to generate said DOCSIS system clock* (fig. 20 "cTM master clock 27 MHz 2072").

Claim 4, *wherein said step of recovering said MPEG system clock comprises locking a local 27 MHz clock based on said received MPEG PCR value* (fig. 20 "cTM master clock 27 MHz 2072").

Claim 5, *identifying a number of packets of said MPEG Transport Stream; and applying either said MPEG clock value or said generated DOCSIS clock value to said number of packets based on said identification* (see "The MPEG packets generated by the preferred embodiments of the present invention that carry an adaptation field generally have the program clock reference flag (PCR) set to 1 to indicate that a program clock reference is carried in the adaptation field" recited [0169] lines 7-12).

Claim 6, *wherein said packets are identified by a packet identifier located in said packet* (see "The MPEG packets ... that carry an adaptation field generally have the program clock reference flag (PCR) set to 1" recited [0169] lines 7-10 and also "The cable transmission physical (CT PHY) layer of a communication system utilizing the preferred embodiments of the present invention does utilize the thirteen bit packet identifier (PID) field to specify various streams of MPEG packets" recited [0165] lines 1-5. Therefore, PID with the PCR flag set to 1 uniquely identifies the packets with PCR value.)

Claim 7, *wherein said packets are identified as either a DOCSIS packet or a non-DOCSIS packet* (see "the thirteen bit packet identifier (PID) field to specify various streams of MPEG packets" cited above).

Group of claim 8:

Claim 9, *wherein said multiplexed Transport Stream is configured to be received by one tuner and one demodulator* (fig. 12 see "RF RX 1222" for RF receiver, noting "RF RX" by definition is "tuning into certain RF", and see also "downstream demod 1224").

Claim 10, *wherein said signal receiver is configured to:*

receive said MPEG PCR values (fig. 20 "cTM downstream front end to extract MPEG 2052", which contains PCR values as shown in the transmission side "42-bit counter and MPEG framer (PCR insertion) 2046");

recover said MPEG system clock (fig. 20 "PCR PARSER 2054");

scale said MPEG system clock (fig. 20 "divide by 6 1068") *to generate a DOCSIS system clock* (refer to fig. 20 "cTM master clock 27 MHz 2072" and see

"this 27 MHz cTM master clock has been generally locked to the TMTS master clock 2036, which was further locked to the 8kHz reference source in phase locked loop" recited [0181] lines 6-9) *to generate said DOCSIS system clock* (fig. 20 "cTM master clock 27 MHz 2072").

Claim 11, *wherein said MPEG system clock is recovered by locking a local clock disposed in said signal receiver based on said received MPEG PCR values* (see "this 27 MHz cTM master clock has been generally locked to the TMTS master clock 2036, which was further locked to the 8kHz reference source in phase locked loop" recited [0181] lines 6-9).

Claim 12, *wherein said signal receiver forms a part of a set-top box* (it is well known in the art of cable network that modem is an integrated part of a set-top box and Sorenson discloses cTM, or client transport modem, as cable data receiver).

Claim 13, *wherein said signal transmitter forms a part of a headend unit* (see fig 5a for "TMTS 215" in "distribution hub and/or headend 510").

Group of claim 14:

Claim 15, *wherein multiplexed Transport Stream is configured to be received by one tuner and one demodulator* (fig. 12 see "RF RX 1222" for RF receiver, noting "RF RX" by definition is "tuning into certain RF", and see also "downstream demod 1224").

Claim 16, *wherein said means for receiving signal is configured to:*

receive said MPEG PCR values (fig. 20 "cTM downstream front end to extract MPEG 2052", which contains PCR values as shown in the transmission side "42-bit counter and MPEG framer (PCR insertion) 2046");

recover said MPEG system clock (fig. 20 "PCR PARSER 2054"); *and*

scale said MPEG system clock (fig. 20 "divide by 6 1068") *using a phase-locked loop to generate said DOCSIS system clock* (refer to fig. 20 "cTM master clock 27 MHz 2072" and see "this 27 MHz cTM master clock has been generally locked to the TMTS master clock 2036, which was further locked to the 8kHz reference source in phase locked loop" recited [0181] lines 6-9) *to generate said DOCSIS system clock* (fig. 20 "cTM master clock 27 MHz 2072").

Group of claim 17:

Claim 18, *wherein said multiplexer is configured to multiplex said DOCSIS data stream into said MPEG Transport Stream comprises overwriting a number of null packets of said MPEG Transport Stream with a number of packets containing DOCSIS data* (refer to fig. 23 and see "the TMTS includes TMTS controller 2372 that operates with downstream map state machine 2374 to cause the Ethernet data from the correct data flow to be placed in the proper octet of the MPEG frames" recited p26 right col. lines 2-6. It should be noted that, a) Sorenson is using Ethernet data here to demonstrate the feature. Fig. 4 shows that "DOSSIS data 403" can be equally multiplexed as that of Ethernet data from "802.3 PHY" sources. Therefore, it is obvious that the same feature said above is equally applicable to DOCSIS; b) it is obvious to one skilled in the art that said "correct data flow to be placed in the proper octet of the MPEG frames" will have

to be placed in null octets or otherwise MPEG data will be lost, causing serious playback problem in the receiving side).

Claim 19, *wherein said transmitter is further configured to transmit said multiplexed MPEG Transport Stream including said MPEG PCR values to a receiving device* (refer to fig. 20 and see "MPEG framer 2046 performs the function of inserting the program clock reference into MPEG frames. Interval counter 2042 generates a 0.1 Hz interval clock 2044 that generally determines that rate at which snapshots of the 42 bit counter are sent downstream as the program clock reference (PCR) in the adaptation field of MPEG packets" recited [0179] lines 3-9).

Group of claim 20:

Claim 21, *wherein said receiver is configure to:*

receive said MPEG PCR values (fig. 20 "cTM downstream front end to extract MPEG 2052" noting that said "MPEG" was earlier having PCR inserted wherein as shown in fig. 20 "42-bit counter and MPEG framer (PCR insertion) 2046");

lock a local clock disposed in said receiver based on said received MPEG PCR values (see "this 27 MHz cTM master clock has been generally locked to the TMTS master clock 2036, which was further locked to the 8kHz reference source in phase locked loop" recited [0181] lines 6-9);

compute a difference between said received PCR values and said local clock (see "Based on the PCR value extracted from MPEG adaptation fields, the

client transport modem 2006 determines how much the cTM master clock has drifted relative to the TMTS master clock" recited [0180] lines 6-9); *and*

adjust the frequency of said local clock based on said computed difference (see "Counter and loop control 2062 determines the amount and direction of the relative clock drifts between the cTM and the TMTS and sends control signals to the cTM oscillator to correct the relative clock drift" rectied [0180 lines 9-13).

Groups of claim 22 and 26:

See discussions above for claims 22 and 26.

3. Claims 22 and 26 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sorenson et al (US 2003/0053476, Sorenson hereinafter) in view of Thi et al (US 2002/0061012, Thi hereinafter) and further in view of Holloway et al (US 2002/0012343, Holloway hereinafter)

Examiner's note: Sorenson presents his system by **functionalities**, such as "Integration Into Existing Cable Network Architecture" section (starting with [0077]) discussing multiplexing data streams, "Frame Management Sublayer (FMS) Data Flow" section (starting [0149]) disclosing certain hardware configurations and data protocols, and "Network Clocking" section (starting with [0171]) teaching associated clock synchronization and recovering. It should be understood that all of the sections are different parts of the architecture for "mapping of bit streams into MPEG frames" as the title of the patent application suggests and thus are interdependent thereupon one another.

- **Regarding independent claims 22 and 26**

Sorenson discloses "mapping of bit streams into MPEG frames" (p1 left col. lines 1-2) wherein data are communicated between "transport modem termination system (TMTS)", fig. 12 left half, as downlink/uplink transmitter/receiver, and "client transport modems (CTM)", fig. 12 right half, as downlink/uplink receiver/transmitter, via "CT (cable transmission) network", fig. 12 item 1220, comprising the following features:

Claims 22 and 26, *a method for multiplexing Data Over Cable Service Interface Specifications (DOCSIS) data into an Moving Pictures Experts Group (MPEG) Transport Stream* (see "Each downstream data flow is fragmented into individual octets that are multiplexed into MPEG packets" recited Abstract lines 8-9. Also refer to fig. 4 depicting "DOCSIS data 403" being multiplexed by multiplexer 415 or "combiner 415" as termed [0086] line 5 and see "support downstream transmission for commonly-deployed services such as, but not limited to, DOCSIS cable modems and digital TV using MPEG video" recited p12 left col. lines 3-6) *comprising:*

multiplexing a DOCSIS data stream into an MPEG Transport Stream (see above cited texts);

transmitting said multiplexed Transport Stream (see fig. 20 for transmission indication arrow below "QAM modulator(s) 2048" to "CT network 2008");

receiving said multiplexed Transport Stream in a receiving device (refer to fig. 20 and see "On the downstream side the client transport modem (cTM 2006)

includes the hardware and/or software to properly extract the MPEG frames and interpret the fields" recited [0180] lines 1-3);

Sorenson does not expressly disclose the following features:

Claim 22, *synchronizing an MPEG system clock and a DOCSIS system clock*;

Claim 26, *synchronizing an MPEG system clock and a DOCSIS system clock to a third clock;*

(Examiner's note: It should be pointed out that the implication of said feature is in fact therein Sorenson because it is well known in the art that multiplexing two different data streams needs to have the data streams first synchronized to each other or a common reference clock according to certain time sequence or otherwise the result of multiplexing will be unpredictable and undesirable. Note also although preferably using MPEG PCR as clock reference (fig. 20 "MPEG input clock 2016"), Sorenson discloses using different reference clocks for his system (see fig. 20 "reference clock selection 2026" with three different types, "down stream T1 input 2012", "8 KHz input clock 2014", and "27 MHz MPEG input clock 2016")).

Thi, regardless above cited implied feature of Sorenson, discloses a "cable modem with voice processing capability" (p1 left col. lines 1-2) wherein a "DOCSIS MAC extracts DOCSIS MAC frames from MPEG-2 frames" ([0122] lines 6-7) comprising the feature of:

Claim 22, *synchronizing an MPEG system clock and a DOCSIS system clock;* and

Claim 26, *synchronizing an MPEG system clock and a DOCSIS system clock to a third clock.*

(see "in one aspect of the present invention, a method of synchronizing data clocked by a first clock to a second clock includes generating a clock error signal as a function of one ore more data control flags, and fractionally resampling the data as a function of the offset" recited [0010])

It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the system of Sorenson by adding the data clock synchronization of Thi to Sorenson, noting that Sorenson has in fact implicitly taught clock synchronization as is necessary for data multiplexing, in order to provide a more convenient gateway "for interfacing telephony voice with DOCSIS compatible networks" as taught by Thi ([0002] lines 2-4).

Sorenson also discloses, as a design choice, using MPEG PCR as a reference to recover the reference clock of downstream data such as DOCSIS, of which steps are shown through fig. 20 as follows ***a:*** "PCR insertion 2048" into MPEG frame; ***b:*** "QAM modulation 2048" which "support(s) downstream transmission for commonly-deployed services such as, but not limited to, DOCSIS cable modems and digital TC using MPEG video" recited p12 left col. lines 3-6; ***c:*** "cTM extracts MPEG 2052"; ***d:*** "PCR parsing 2054" and ***e:*** generating "cTM master clock 2072" based on said PCR. These steps provide obvious thoughts to one skilled in the art that, instead of using MPEG PCR to recover DOCSIS, it can be done as an alternative design and without technical

difficulties to use DOCSIS timestamp to recover MPEG or use a third reference clock to recover both DOCSIS and MPEG.

What is lacking from Sorenson in view of Thi is expressly teaching of said alternatives, especially for:

Claim 22, multiplexing MPEG/DOCSIS *while preserving the accuracy of a number of DOCSIS SYNC timestamps values;* transmitting MPEG/DOCSIS by *including said DOCSYS SYNC timestamp values; recovering said DOCSIS SYNC timestamp values; and generating an MPEG system clock based on said DOCSIS SYNC timestamp values;*

Claim 26, transmitting by *including a number of time stamp values of said third clock; recovering said time stamp values from said third clock; and generating both an MPEG system clock and a DOCSIS system clock based on said time stamp values from said third clock.*

Holloway discloses a "transceiver method and signal therefor embodied in a carrier wave for a frame-based communication network" (p1 left col. lines 1-4) wherein "cable modems employ a DPLL (digital phase locked loop) to track the reference clock which is located in the cable modem head end equipment" ([0395] lines 1-3) comprising the following features:

Claim 22, multiplexing MPEG/DOCSIS *while preserving the accuracy of a number of DOCSIS SYNC timestamps values; transmitting MPEG/DOCSIS by including said DOCSYS SYNC timestamp values;* (see "the CM [cable modem] DOCSIS clock maintains synchronized with the headend DOCSIS clock through the exchange of ranging messages and SYNC messages with the DOCSIS head

end equipment. The timestamps in these message are inserted and extract as the messages leave or enter the DOCSIS MAC devices" recited [0396] lines 1-4); *recovering said DOCSIS SYNC timestamp values* (see "The CM extracts the timestamp from the SYNC message as the bits are arriving off of the wire" recited [0396] lines 9-10); *and generating an MPEG system clock based on said DOCSIS SYNC timestamp values* (see "This timestamp is passed to the TRC [timing registration circuit], where an immediate comparison to the local timestamp is made. Any difference is used to adjust a DPLL which controls the local clock frequency" recited [0396] lines 10-14).

Claim 26, transmitting by *including a number of time stamp values of said third clock; recovering said time stamp values from said third clock* (noting that Sorenson already teaches using a third clock as shown in fig. 20 e.g. "reference clock selection 2026" together with for example "downstream T1 input 1012" and "8 KHz input clock 2014" and see also Holloway "the CM [cable modem] DOCSIS clock maintains synchronized with the headend DOCSIS clock through the exchange of ranging messages and SYNC messages with the DOCSIS head end equipment. The timestamps in these message are inserted and extract as the messages leave or enter the DOCSIS MAC devices" recited [0396] lines 1-4) *and generating both an MPEG system clock and a DOCSIS system clock based on said time stamp values from said third clock* (see "The CM extracts the timestamp from the SYNC message as the bits are arriving off of the wire" recited [0396] lines 9-10); *and generating an MPEG system clock based on said DOCSIS SYNC timestamp values* (see "This timestamp is passed to the TRC

[timing registration circuit], where an immediate comparison to the local timestamp is made. Any difference is used to adjust a DPLL which controls the local clock frequency" recited [0396] lines 10-14, noting that it would be obvious to one skilled in the art that such operation can be performed for both DOCSIS and MPEG data streams).

It would have been obvious to one of ordinary skill in the art at the time of the invention to further modify the method of Sorenson by adding the DOCSIS time stamp features of Holloway in order to provide more system alternatives that "minimizes the impact to the MAC design while maintaining some flexibility in the design that allows the synchronization mechanism to be fine-tuned" as pointed out by Holloway ([0395] last four lines).

- **Regarding dependent claims**

Group of claim 22:

Claim 23, Sorenson and Thi do not expressly but Holloway does teach:

receiving said DOCSIS SYNC timestamps values in said receiving device and *recovering said DOCSIS system clock* (see "The CM extracts the timestamp from SYNC message as the bits are arriving off of the wire" recited [0396] lines 9-10);

scaling said DOCSIS system clock using a phase-locked loop to generate said MPEG system clock (see "*any difference is used to adjust a DPLL which controls the local clock frequency*" recited [0396] lines).

Claim 24, Sorenson discloses *wherein said step of recovering said* MPEG *system clock comprises locking a local 27 MHz clock based on said received*

MPEG PCR *values* (refer to fig. 20 "cTM clock 27 MHz 2072" and see "this 27 MHz cTM master clock has been generally locked to the TMTS master clock 2036, which was further locked to the 8kHz reference source in phase locked loop" recited [0181] lines 6-9). Holloway discloses using DOCSIS timestamp instead of MPEG PCR as cited above. A modification, as obvious to one skilled in the art as cited above, of Sorenson by Holloway would naturally achieve *recovering said* MPEG *system clock comprises locking a local 27 MHz clock based on said received* MPEG PCR *values.*

Claim 25, Sorenson discloses *identifying a number of packets of said MPEG Transport Stream; and applying either said MPEG clock or said generated DOCSIS clock values to said number of packets based on said identification* (see "The MPEG packets generated by the preferred embodiments of the present invention that carry an adaptation field generally have the program clock reference flag (PCR) set to 1 to indicate that a program clock reference is carried in the adaptation field" recited [0169] lines 7-12).

Group of claim 26:

Claim 27, Sorenson and Thi do not expressly but Holloway does teach:

receiving said time stamp value from said third clock in said receiving device and *recovering said third clock* (see "The CM extracts the timestamp from SYNC message as the bits are arriving off of the wire" recited [0396] lines 9-10);

scaling said third clock using a first a phase-locked loop to generate said MPEG system clock; and scaling said third clock using a second phase-locked

loop to generate said DOCSIS system clock (see "*any difference is used to adjust a DPLL which controls the local clock frequency*" recited [0396] lines).

Claim 28, Sorenson discloses *wherein said step of recovering said* MPEG *system clock comprises locking a local* 27 MHz *clock based on said received* MPEG PCR *values* (refer to fig. 20 "cTM clock 27 MHz 2072" and see "this 27 MHz cTM master clock has been generally locked to the TMTS master clock 2036, which was further locked to the 8kHz reference source in phase locked loop" recited [0181] lines 6-9). Holloway discloses using DOCSIS timestamp instead of MPEG PCR as cited above. A modification, as obvious to one skilled in the art as cited above, of Sorenson by Holloway would naturally achieve *recovering said third clock comprises locking a local clock having the same operating frequency as said third clock, wherein said locking is based on said received time stamp values.*

Claim 29, Sorenson discloses *identifying a number of packets of said MPEG Transport Stream; and applying either said MPEG clock or said generated DOCSIS clock values to said number of packets based on said identification* (see "The MPEG packets generated by the preferred embodiments of the present invention that carry an adaptation field generally have the program clock reference flag (PCR) set to 1 to indicate that a program clock reference is carried in the adaptation field" recited [0169] lines 7-12).

Conclusion

4. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

US 2003/0,058,890 provides MPEG program clock reference (PCR) delivery for support of accurate network clocks.

US 2003/0,189,571 teaches a display engine of a video and graphics system includes one or more processing elements and receives graphics from a memory.

US 2003/0,200,548 provides method and apparatus for viewer control of digital TV program start time.

US 2001/0,030,959 discloses data delivery in set-top box by mapping ATM formatted MPEG SI data.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Andrew Lai whose telephone number is 571-272-9741. The examiner can normally be reached on M-F 7:30-5:00 EST, Off alternative Fridays.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Kwang Yao can be reached on 571-272-3182. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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